

ABSTRACT OF THE DISCLOSURE

A non-planar log-periodic antenna feed with low ohmic loss, intermediate gain multioctave bandwidth, and dual polarization can be integrated with a low-noise MMIC amplifier, at ambient or cryogenic temperatures. Long, lossy transmission lines with nearly 1 dB loss, normally required for connecting log-periodic antennas to microwave signal detection circuits, are unnecessary in this design. Amplifiers are positioned close to the antenna terminals at the vertex of the antenna, inside a square pyramidal shield with half the opening angle of the antenna arms. The non-obvious idea is that a conductor enclosing a large volume of self-similar shape between the antenna arms enhances gain while preserving the frequency-independence of the log-periodic antenna over its operating bandwidth. The design has been reduced to practice. A 1-10 GHz prototype has been range tested. A small microwave telescope which incorporates this feed can achieve over multioctave bandwidths an A/T (sensitivity) that is unprecedented. Simple construction and low cost of manufacture make it ideal for use in telescope arrays.